

## CLAIM(S):

1. An irradiation system comprising:
  - a radiation source for providing a radiation beam at a controlled power level;
  - a product location system for providing product so that the radiation beam impinges on the product;
  - a sensor system for measuring an intensity of the radiation beam that passes through the product; and
  - a control system for adjusting the power level of the radiation beam based on the intensity of the radiation beam that passes through the product.
2. The irradiation system of claim 1, wherein the radiation source provides an electron beam.
3. The irradiation system of claim 1, wherein the radiation source provides an x-ray beam.
4. The irradiation system of claim 1, wherein the product location system comprises a conveyor.
5. An irradiation system comprising:
  - a radiation source for providing a radiation beam at a first controlled intensity, the radiation beam having at least an x-ray component with a second intensity that is proportional to the first intensity;

a product location system for advancing the product past the radiation beam at a controlled speed, so that the radiation beam impinges on the product;

a sensor system for measuring an intensity of a portion of the x-ray component of the radiation beam that passes through the product;

a control system for adjusting the first intensity of the radiation beam based on a difference between the intensity of the portion of the x-ray component of the radiation beam that passes through the product and the intensity of the x-ray component of the radiation beam.

6. The irradiation system of claim 5, wherein the radiation source provides an electron beam.

7. The irradiation system of claim 5, wherein the radiation source provides an x-ray beam.

8. The irradiation system of claim 5, wherein the sensor system includes a scaled linear x-ray sensor array.

9. The irradiation system of claim 8, wherein the sensor system further includes an attenuator plate for scaling the intensity of the portion of the x-ray component of the radiation beam that passes through the product to correspond with a dynamic range of the linear x-ray sensor array.

10. The irradiation system of claim 5, wherein the product location system comprises a conveyor.

11. An irradiation system comprising:
  - a radiation source for providing a radiation beam having a first intensity profile, the radiation beam having at least an x-ray component with a second intensity profile that is proportional to the first intensity profile;
  - a product location system for providing product so that the radiation beam impinges on the product;
  - a sensor system for measuring an intensity of a portion of at least part of the x-ray component of the radiation beam that passes through the product;
  - a control system for interpreting measurements taken by the sensor system to determine a relative location and type of the product that the radiation beam impinges upon, the control system being responsive to the determined relative location and type of the product to adjust at least one of the first intensity profile of the radiation beam, a location pattern of successive radiation beams, and a speed of advancement of product by the product location system.
12. A method of irradiating product, comprising:
  - providing a radiation beam at a controlled intensity;
  - directing the radiation beam onto product;
  - measuring an intensity of a portion of the radiation beam that passes through the product; and
  - adjusting the intensity of the radiation beam based on a difference between the intensity of the portion of the radiation beam

that passes through the product and the intensity of the radiation beam itself.

13. The method of claim 12, wherein providing a radiation beam comprises generating an electron beam.

14. The method of claim 13, wherein providing a radiation beam further comprises converting the electron beam to an x-ray beam.

15. The irradiation system of claim 12, wherein directing the radiation beam onto product comprises advancing product past the radiation beam on a conveyor.